CHAPTER – I

INTRODUCTION

In this Modern era people have accepted and performing physical activity in their day to day life to lead a healthy life which contributes contribute to our Lifestyle management and also in management of the diseases such as Heart Attack stroke diabetes blood pressure except so people are regularly adopting them into physical activity which is considered as free time activity and even for recreational purpose which leads to achieve excellence in physical fitness and also in excellence in sports events and performance.

Achieving medals in the international competitions is the ultimate aim ofevery athlete. In order to attain success, certain factors are to be considered. Thesefactors include internal and external. The internal factors are psychological,physical, physiological, nutritional etc. The external factors include - firstly, theinfluence of coach, family, society, country and even friends and audience.Secondly, the environment, facilities, biomechanics, training methods, duration ofpractice etc. Higher level performance in sports is the desire, determination,dedication and hard work of an athlete and also the in-depth knowledge of factorsinfluencing the sports performance and its practical application.Achieving medals in the international competitions is the ultimate aim ofevery athlete. In order to attain success, certain factors are to be considered. Thesefactors include internal and external. The internal factors are psychological,physical, physiological, nutritional etc. The external factors include - firstly, the influence of coach, family, society, country and even friends and audience.

Secondly, the environment, facilities, biomechanics, training methods, duration ofpractice etc. Higher level performance in sports is the desire, determination,dedication and hard work of an athlete and also the in-depth knowledge of factorsinfluencing the sports performance and its practical application. The inherited factors can be improved or developed through training to acertain extent but some cannot be changed. To expand the knowledge and to studygenetic matters precisely, the psychological, physical, physiological subjects aredivided into different branches and sub-branches. (The Major Branches ofScience. 2018).

A deeper study of these subjects is needed to identify the exact orprecise inherited performance factor which has a direct connection with the sportsperformance. The researchers need to conduct more studies related to these areasin order to bring out more genuine and useful results in the sports society. The study dealing with the form and structure of organisms is called Morphology. This includes the external and internal organs and its specific physical features. The study to evaluate the outward appearance of

an organism oran organ of an organism with respect to shape, size, and structure is calledExternal Morphology. The study of internal parts is called Internal Morphologyor Anatomy.In this world, all living organisms are differentiated from each other intheir size, shape, model, colour, appearance etc. The differences are visible inhumans, animals, plants, aquatic animals, microorganisms etc. The structure,shape, colour, size etc., are matching in the species of similar categories. But insome cases, the species are coming under similar category and the structure,shape, internal organ functions etc. are alike but the size and colour aredistinguished. While seeing the human beings, the internal organs and itsfunctions, structure, etc. are similar but the size of internal organs, size of thebone, body size and shape, the colour of skin, eyes, and hair etc. are different. To study human beings separately, it is noticeable that different types ofpeoples are living in different countries and their colour, shape and other factorsare different. For example, the Chinese, Africans, Europeans etc. While goingthrough historical studies, it is described that the differences are happeningbecause of ancestors. But the causes may include the geographical location,environment, food habits and maybe some unknown reasons yet to find out. It isa complex subject to study and examine and also difficult to reach a genuineconclusion. How these differences are influencing sports performance is a demand fordiscussion. International competitions like the Olympics and WorldChampionships, the competitors are from various countries and their body sizeand shape are distinct.

PHYSIOLOGY

Physiology is the scientific study of functions and mechanisms in a living system. As a sub-discipline of biology, physiology focuses on how organisms, organ systems, individual organs, cells, and biomolecules carry out the chemical and physical functions in a living system. The Latin root physio- generally means "physical", so human physiology deals with just about everything that keeps us alive and working, and other physiology specialties do the same for other animals and for plants. To do anything serious in the field of health, you've obviously got to know how the body's organs and cells function normally. Physiology used to be considered separately from anatomy, which focuses on the body's structures; however, it's now known that structure and function can't easily be separated in a scientific way, so "anatomy and physiology" are often spoken of in the same breath.Physiological fitness can be defined as fitness relating to the physical aspects of the human body. Other than psychological and emotional fitness assessments, physiological fitness assessments involve testing a client's cardio-vascular fitness, muscular strength, flexibility, gait, and others

VOLLEYBALL

a game for two teams, usually of six players, in which a large ball is hit by hand over a high net, the aim being to score points by making the ball reach the ground on the opponent's side of the court. For a volleyball player to be effective, he needs to be able to demonstrate a wide range of fitness components. Speed. Volleyball serves and smashes result in very fast ball speed, so players also need to be quick to get to the right position to return or pass the ball. Agility, Power, Flexibility, Endurance.

NETBALL

a seven-a-side game in which goals are scored by throwing a ball so that it falls through a netted hoop. By contrast with basketball, a player receiving the ball must stand still until they have passed it to another player. For Netball there are seven components of physical fitness to consider. These are as follows: Aerobic Capacity, Muscular power, Agility, Speed, Coordination, Balance and Reaction time. Aerobic capacity is also known as "Cardio-Vascular" respiratory endurance or stamina.

KABADDI

a sport of Indian origin played by teams of seven on a circular sand court. The players attempt to tag or capture opponents and must hold their breath while running, repeating the word ‘kabaddi’ to show that they are doing so. The game calls for agility, good lung capacity, muscular co-ordination, presence of mind and quick responses. For a single player to take on seven opponents is no mean task, requires dare as well as an ability to concentrate and anticipate the opponent's moves. Kabaddi requires many essential components i.e., aerobic-anaerobic capacity, strength, power, neuromuscular coordination and muscular endurance.

KHO- KHO

Kho-Kho is a traditional Indian sport, that is one of the oldest outdoor sports, dating back to ancient India. ... Kho-kho is a game traditional Indian sport, that is one of the oldest outdoor sports, dating back to ancient India. It is played most often by school children in India and Pakistan and is a competitive game. kho-kho helps to increase stamina. It helps in motor development. It helps in social and mental development of the child. Playing kho-kho keeps children well, strong, motivated, enthusiastic and young. It helps in better co-ordination and flexibility.

STATEMENT OF THE PROBLEM

"INFLUENCE OF MORPHOLOGICAL CHARACTERISTICS ON SELECTED PHYSICAL AND PHYSIOLOGICAL VARIABLES OF SPORTS WOMEN".

OBJECTIVES

- To identify the morphological characteristics of sports women
- Study the influence of selected morphological characteristics on sports women
- To study Influence of selected morphological characteristics on selected physical variables
- To study influence of selected morphological characteristics on selected physiological variables
- To identify which morphological characteristics majorly influence on physical and physiological variables
- To establish the influence of morphological characteristics on physical and physiological variables of sports women that is volleyball players, netball player, Kabaddi Players and Kho-kho players.

HYPOTHESIS

- There would be a significant influence of morphological characteristics on selected physical variables of sports women
- There would be a significant influence of morphological characteristics on selected physiological variables of sports women
- There will be no significant difference of morphological characteristics among sports women .

SIGNIFICANCE OF THE STUDY

- The study would be helpful to coaches' physical education teachers for selecting the place for their respective games
- The study will be helpful in talent identification by recognising the influence morphological characteristics influence on physical and physiological variables
- This study will help in prediction of performance of a player
- This Study help to find the players efficiency and their capability

- This study will help coach to ascertain their players ability and ascertaining them in their capable playing position

DELIMITAION

- The study is delimiter to the players of Volleyball, netball, Kabaddi and kho-kho of Karnataka state only
- Study is delimited to 120 sample only women sample only women's player
- The study is the limited to the players age ranging from 18 to 25 only
- The study is limited to the selected morphological characteristics BMI, body height, body weight or mass BMI body fat percentage, hip to waist ratio body muscle mass
- The study is delimited to the selected physical variable that is flexibility speed and Flexibility
- The study is be limited to the selected physiological variables that is blood pressure , resting pulse rate and vital capacity
- The study is limited to inter university level players only

LIMITATION

- Certain factors like socio economic status and training schedule were considered as limitation of the study
- The influence of certain factors like Lifestyle daily, diet and other factors on the result of their physical and physiological performance is considered as limitation of the study
- The influence of psychological variables during the physical test and physiological test were considered as limitation of the study
- The variance in playing position and performance level in their respective games were considered as limitation of the study which cannot be controlled by the researcher
- Control over the physical activity level of non-sports person will be not taken into consideration hence it is a considered as limitation of the study.

DEFINITION OF THE TERMS

- **Morphology:** The science of structure and form of organisms without regard to function.

- **Height:**The height of a person or thing is their size or length from the bottom to the top.

- **Weight:**The force with which a body is attracted to Earth or another celestial body and which is equal to the product of the object's mass and the acceleration of gravity. A measure of the heaviness of an object.

- **BMI:**Body mass index is a value derived from the mass and height of a person. The BMI is defined as the body mass divided by the square of the body height, and is expressed in units of kg/m^2

- **Body fat percentage:**The body fat percentage (BFP) of a human or other living being is the total mass of fat divided by total body mass, multiplied by 100; body fat includes essential body fat and storage body fat. Essential is necessary to maintain life and reproductive functions.

- **Body muscle mass:** muscle mass is the amount of muscle in your body, including skeletal muscles, smooth muscles, and cardiac muscles

- **Waist–hip ratio** or waist-to-hip ratio (WHR) is the dimensionless ratio of the circumference of the waist to that of the hips. This is calculated as waist measurement divided by hip measurement (W/H). For example, a person with a 30″ (76 cm) waist and 38″ (97 cm) hips have a waist–hip ratio of about 0.78.

- **Physical fitness:** Physical fitness is a state of health and well-being and, more specifically, the ability to perform aspects of sports, occupations and daily activities.

- **Flexibility:** is the ability of a joint or series of joints to move through an unrestricted, pain free range of motion

- **Agility:** is defined as the ability to move the limbs quickly and easily in different directions or quickness of motion.

- **Speed** is a way of measuring how quickly something is moving or being done, or something moving fast.

- **Physiology** the branch of biology that deals with the normal functions of living organisms and their parts.

- **Physiological fitness** can be defined relating to the physical aspects of the human body.

- **Vo2 max:** VO2 max, or maximal oxygen consumption, refers to the maximum amount of oxygen that an individual can utilize during intense or maximal exercise.

- **Blood pressure: it is the pressure of the blood on the wall of our artiries during blood pumped around our body**

- **Vital capacity** the greatest volume of air that can be expelled from the lungs after taking the deepest possible inhalation.

CHAPTER – II

REVIEW OF RELATED LITERATURE

Quarried et al. (1995) investigated the anthropometric and physical

performance characteristics of New Zealand rugby players of different ages and both sexes. 356 rugby players (264 male, 92 female) took part in the study during a single season. Playing grade ranged from schoolboys and schoolgirls to senior men and women. Assessment of height, weight, neck circumference, and somatotype were performed before the competitive rugby season. A battery of six physical performance assessments was completed after the anthropometry. Analysis of variance was used to examine differences in these variables between field positions and grades. The results of their study shown significant differences between forwards and backs on anthropometric and physical performance variables were apparent at all grades assessed. In terms of anthropometric characteristics, forwards of a given grade were generally taller, possessed greater body mass, and were more endomorphic and less ectomorphic than backs of the same grade. The backs tended to perform better on physical performance measures than forwards, being more aerobically fit, faster, more agile, and possessing a higher degree of muscular endurance. Differences in anthropometry and physical performance attributes were also apparent between players from the various grades. The players at higher levels were generally larger, and per- formed better on tests of physical performance than the players at lower levels. These differences were found in both sexes. They concluded that greater body mass of the forwards allows them to obtain greater momentum than the backs when sprinting. The ability to obtain greater momentum is important in the body contact phases of the game. Forwards may compromise their aerobic fitness and speed to some extent in order to maintain a high body mass. The anthropometric and physical performance characteristics of players appear to reflect the demands placed on them by the sport.

Bitar et al. (2000) evaluated the changes in anthropometrical features, body composition, physical capacities, and energy expenditure of boys and girls during the period of onset of puberty. Sixteen children (8 boys and 8 girls)were recruited in the same school-class and studied both at 10.4 and 12.8 years of age. Body composition was assessed by bioimpedance analysis. Peak oxygen uptake was measured using an automated on-line system during exercising on a cycle ergometer. They found that during the onset of puberty, boys and girls gained fat-free mass, whereas fat mass gain was high in girls than in boys. Peak VO2 adjusted for differences in FFM was not significantly affected by gender or

pubertal stage. However, adjusted external mechanical power performed at peak VO2 was higher in pubertal than in prepubertal children. They concluded that the increases in physical capacities and energy expenditure during the onset of puberty indicated clear gender differences, which could be explained mainly by alterations of body composition in boys and girls. They also stressed the significant increase in energy requirements of children, especially boys, at an early stage of puberty.

The study of Keogh, Weber, Dalton (2003) was meant to develop an effective testing battery for female field hockey by using anthropometric, physiological, and skill-related tests to distinguish between regional representative (Rep, n = 35) and local club level (Club, n = 39) female field hockey players. Rep players were significantly leaner and recorded faster times for the 10-m and 40-m sprints as well as the Illinois Agility Run (with and without dribbling a hockey ball). Rep players also had greater aerobic and lower body muscular power and were more accurate in the shooting accuracy test, $p < 0.05$. No significant differences between groups were evident for height, body mass, speed decrement in 6 x 40-m repeated sprints, handgrip strength, or pushing speed. Their results indicated that %BF, sprinting speed, agility, dribbling control, aerobic and muscular power, and shooting accuracy can distinguish between female field hockey players of varying standards. Therefore, talent identification programs for female field hockey should include assessments of these physical parameters.

Duncan, Woodfield and Al-Nakeeb (2006) investigated the anthropometric and physiological characteristics of junior elite volleyball players. For this he selected Twenty five national level volleyball players (mean (SD) AGE 17.5 (0.5) years) and assessed then on a number of physiological and anthropometric variables. Somatotype was assessed using the Heath-Carter method, body composition (% body fat, % muscle mass) was assessed using surface anthropometry, leg strength was assessed using a leg and back dynamometer, low back and hamstring flexibility was assessed using a leg and back dynamometer, low back and hamstring flexibility was assessed using the sit and reach test, and the vertical jump was used as a measure o flower body power. Maximal oxygen uptake was predicted using the 20 m multistage fitness test. The results of their investigation showed that Setters were more ectomorphic 9p<0.05) and less mesomorphic (p<0.01) than centres. Mean (SD) of somatotype (endomorphic, mesomorphy, ectomorphy) for setters and centres was 206 (0.9), 1.9 (1.1), 5.3 (1.2 and 2.2 (0.8), 3.9 (1.1)3.6 (0.7) respectively. Hitters had significantly greater low back and hamstring flexibility than opposites. Mean (SD) for sit and reach was 19.3 (8.3) cm for opposites and 37 (10.7) cm

for hitters. There were no other significant differences in physiological and anthropometric variables across playing positions (all $p>0.05$). They concluded from the results of this investigation that Setters tend to be endomorphic ectomorphs, hitters and opposites tend to be balanced ectomorphs, whereas centres tend to be ectomorphic mesomorphic.

Calò et al. (2009) conducted research to verify if morphological features could influence the performance of different positional groups. Eachplayer was measured for her total and sitting height, weight, 9 skinfolds thickness and bioelectrical impedance analysis. Different equations were used to calculate the Fat% from skinfolds thickness. Average height is not a crucial advantage for this sport. On the contrary the proportion trunk-limb seems to play an important role for the performance of the midfield players. Percentage of body fat of the hockey players was lower than the Fat% of the non-athletes' women of the same age. Significant differences were found between Fat% determined by skinfolds thickness and Fat% obtained by bioelectrical impedance analysis. The results of their study indicated that there are significant differences in anthropometric features and in body composition between positional groups, stressing the importance of a specific training program.

Gaurav, Singh and Singh (2010) compared the anthropometric characteristics and somatotype of the Guru Nanak Dev University, Amritsar"s male basketball players and volleyball players. Sixty three sportspersons (volleyball=36 and basketball=27) of age group 18-25 years were selected from different colleges affiliated to Guru Nanak Dev University, Amritsar, Punjab. All the participants were assessed for height, weight, breadths, girths and skin fold thickness. An independent samples t-test revealed that basketball players had significantly higher height ($p<0.01$), weight ($p<0.01$) and body surface area ($p<0.01$) as compared to volleyball players. The basketball players were also found to have significantly greater biceps ($p<0.01$) and suprailia ($p<0.01$) skin fold thicknesses, calf circumference ($p<0.05$), percent body fat ($p<0.01$), total body fat ($p<0.01$), fat free mass ($p<0.05$) and endomorphic component ($p<0.05$) as compared to volleyball players. Volleyball players had significantly greater body density ($p<0.01$) as compared to basketball players. The basketball and volleyball players of their study were found to have higher percentage body fat with lower body height and body weight than their international counterparts.

Reis, V. M., "et al" (2012) had conducted a study of 100m and 200mFront Crawl Performance Prediction Based on Anthropometric and PhysiologicalMeasurements. The study compared the anthropometric and physiological profilesof 100m and 200m front crawl swimmers. The purpose of the study was toidentify anthropometric and physiological variables for the prediction of theswimmers' performance at the 100m and 200m freestyle event. The participantswere 26 male swimmers and they

were divided into two groups. The participantsperformed a categorized swimming test and an all-out test 100 or 200m maximalswims in different days, in which physiological measures were calculated.Forward step-by-step linear regression models were the statistical techniques usedfor the prediction. The performances were the dependent variable. The age,physiological and anthropometric measures were selected as independentvariables. The models computed were able to predict from 44% (i.e., 200m all-out) 61% (i.e., 200m season best) swimming performance. The predictive powerthe models was less accurate in the 100m event. The authors of this studyconcluded that the extent to which the physiological and anthropometric variablescombine to predict performance is a group specific.

CHAPTER - III

METHODOLOGY

The methodology adapted for the present study "Influence of Morphological characteristics on physical and physiological variables of sports women" selection of subjects, Descriptive design, selection of variables, selection of test, collection of data and statistical procedure have been explained in this chapter.

Selection of subjects:

The purpose of the study was to find out Influence of morphological characteristics on physical and physiological variables of sports women, players age ranged between 18 to 25, The investigator explained the purpose, nature of the study the National and University level women athletes of Volley ball, Netball, kabaddi and Kho-Kho players.

SAMPLE SIZE:

GAMES	VOLLEYBALL	NETBALL	KABADDI	KHO - KHO	TOTAL
UNIVERSITY	15	15	15	15	60
NATIONAL	15	15	15	15	60
TOTAL	30	30	30	30	120

SELECTION OF VARIABLES:

INDEPENDENT VARIABLE		
SL NO	MORPHOLOGICAL CHARACTERISTICS	INSTRUMENTS OF MEASUREMENT
1	Height	Stadiometer
2	Weight	Weighting machine
3	BMI	Formula
4	Body fat mass	Formula
5	Body muscle mass	Formula
6	Hip to waist ratio	Formula

DEPENDENT VARIABLE		
SL NO	**PHYSICAL VARIABLE**	**TESTS**
1	Agility	10 ×4 shuttle run
2	Flexibility	Sit and reach
3	Speed	30 Mt's fly start
SL NO	**PHYSIOLOGICAL VARIABLE**	**EQUIPMENT**
1	Vo2 max	Ergometer or 1.5 mile test
2	Blood pressure	sphygmomanometer
3	Vital capacity	Spirometer

ADMINISTRATION OF THE TEST:

HEIGHT: stadiometer is a piece of medical equipment used for measuring human height. It is usually constructed out of a ruler and a sliding horizontal headpiece which is adjusted to rest on the top of the head , The most basic stadiometer is composed of a ruler and sliding headpiece.

BODYWEIGHT: The subject was requested to stand on centre of the platform of a weighing machine the subject was weighed while wearing light clause and with their feet the weight was recorded in kg

BMI: Mass Index is a simple calculation using a person's height and weight. The formula is **BMI = kg/m^2**

BODY FAT PERCENTAGE : To calculate body fat percentage, add your waist and hip measurements, and then subtract the neck measurement to determine your circumference value

(1.20 x BMI) + (0.23 x Age) - 16.2 = Body Fat Percentage

BODY MUSCLE MASS OR LEAN BODY MASS:

Lean body mass is calculated as the difference between total body weight and body fat weight, or more simply, the weight of everything except the fat.

WAIST HIP RATIO: Is calculated by dividing your waist measurement by your hip measurement, since the hips are the widest part of your buttocks. The formula is: **WHR= waist circumference / hip circumference.**

AGILITY: The performers start behind the starting line on the signal go and runs to the blocks click pickup 1st and return to the starting line and place block behind the line then repeats the process with 2nd block then the time will be recorded as a score.

FLEXIBILITY: Sit on the floor with the hips, back, and head against a wall, and the legs fully extended and the bottom of the feet against the sit and reach box. Place hands one on top of the other and reach forward as far as possible without letting the head and back come off the wall

30 METER FLYING START: the subject takes a position behind starting line the starter uses the command or whistles then subject starts running and finishes the 13 then another test will stop the time to trials are given then the quickest time will be recorded

Vo2 max: VO2 max, or maximal oxygen consumption, refers to the maximum amount of oxygen that an individual can utilize during intense or maximal exercise.

BLOOD PRESSURE: it is measured by using sphygmomanometer commonly called a blood pressure cuff, measure blood pressure by wrapping it around the upper arm and inflating and recording the reading of the device shown

VITAL CAPACITY: It is the total amount of air exhaled after maximal inhalation. The value is about 4800mL and it varies according to age and body size. It is calculated by summing tidal volume, inspiratory reserve volume, and expiratory reserve volume. it is measured using spirometer, **VC = TV+IRV+ERV.**

STATISTICAL TECHNIQUE

the following statistical analysis for this study the mean, standard deviation and 't' value procedures were used for find out the significant influence among the group Descriptive statistics are used to understand the basic statistical characteristics of the observed variable. ANOVA is used for comparing mean or testing the significance of two or more factors. karl pearson's correlation coefficient method can be to find the correlation between the variables with performance Morphological characteristics on physical and physiological variables Further, obtained values can tested for significance using t-test based on r-value.